

REMARKS

Claims 1-14 and 21-26 remain in this application. Claims 15-20 have been withdrawn. Claims 5, 6 and 21-26 were amended herein.

The Office Action acknowledges that claim 3 is allowable, and that claim 5 would be allowable if rewritten in independent form. Claim 5 has been so rewritten and is now in condition for allowance.

Claims 15-20 have been withdrawn as the result of an earlier restriction requirement, but applicant retains the right to present these claims in a divisional application.

The amendment to Claim 22 adds an additional feature, an embodiment of which may be found in at least paragraph [0040] of the specification. Support for the amendments to claim 6 can be found in embodiments which may be found at least in paragraphs [0049] and [0056], and figures 17 and 23. Support for the amendments to claims 23-26 in embodiments which may be found at least in paragraphs [0034] and [0035], and figure 6. No new matter has been added by these amendments.

Claim 1, 2, 4, 21 and 22 were rejected under 35 U.S.C. §102(e) as being anticipated by *Kawamura et al.* (US6543884, hereinafter *Kawamura*). Claims 6 and 8 were rejected under 35 U.S.C. §102(b) as being anticipated by *Hawkins* (US4863560). Claim 7 was rejected under 35 U.S.C. §103(a) as being unpatentable over *Hawkins*. Claim 9 was rejected under 35 U.S.C. §103(a) over *Hawkins* in view of *Kawamura*. Claim 10 was rejected under 35 U.S.C. §103(a) over *Hawkins* in view of *Hess* (US4719477). Claims 11 and 14 were rejected 35 U.S.C. §102(e) as being anticipated under *Kawamura*. Claim 12 was rejected under 35 U.S.C. §103(a) as being unpatentable over *Kawamura*. Claims 23-26 were rejected under 35 U.S.C. §112. Applicant respectfully traverses.

Rejections Under 35 U.S.C. §102(b), §102(e), and §103(a).

Independent Claim 1

The rejection of claim 1 should be withdrawn as *Kawamura* fails to teach or suggest all the recitations of claim 1 and therefore does not anticipate claim 1.

Focusing now on the specific recitations of claim 1 and the inadequacies of *Kawamura*, claim 1 recites: "A method of etching a substrate surface, comprising the steps of: masking a first portion of the substrate surface with passivation material having edges that define boundaries on the substrate surface such that within the boundaries a second surface portion is exposed for etching; depositing a metal layer over the passivation material; and then etching the second surface portion." (Emphasis added).

Kawamura discloses the use of a passivation layer, and the deposition of a metal layer on top of such a passivation layer (*Kawamura*, Column 7, line 54 to Column 8, lines 6). However, the substrate on which the passivation layer of *Kawamura* is formed does not have any portions exposed for etching. Instead of using the passivation layer as a mask, a separate mask is used to define any area of the passivation layer, metal layers, and any other thin film layers underlying or overlying them, to be etched (*Kawamura*, figure 10D and Column 8, lines 1-6).

As can be seen, *Kawamura* does not teach or suggest: (a) masking a first portion of the substrate with passivation material having edges that define boundaries such that within the boundaries a second surface portion is exposed for etching; and/or (b) then etching the second surface portion defined by edges of the passivation material. Moreover, although a metal layer is deposited on the passivation layer of *Kawamura*, that deposition is not done between a step wherein a portion of the substrate under the passivation is exposed and a step where the exposed portion is etched.

Dependent Claims 2, 4, 21 and 22

Claims 2, 4, 21, and 22 are not anticipated by *Kawamura* at least because of their dependence on claim 1. Moreover, claim 22 has been amended herein to further distinguish the claimed subject matter from the cited art by including "etching the second portion causes the

formation of a trench having angled side walls." As such, the rejection of claims 2, 4, 21, and 22 should be withdrawn.

Independent Claim 6

The rejection of claim 6 should be withdrawn as *Hawkins* fails to teach or suggest all the recitations of claim 6, at least as amended herein, and therefore does not anticipate claim 6.

Claim 6 recites: "A method of masking and etching a surface of a silicon substrate, comprising the steps of: providing on the substrate surface an oxide layer in a pattern having edges that define boundaries of a surface portion such that within and adjacent to the boundaries the surface portion is exposed for etching; covering the oxide layer near the edges with passivation material; and etching the entire surface portion of the silicon substrate that is exposed for etching." (Emphasis added).

As amended, claim 6 recites that the oxide layer leave exposed portions of an underlying silicon substrate and that the entire exposed portions, including those adjacent to the boundary edges of the oxide layer, be etched. In contrast, *Hawkins* discloses using a Si₃N₄ layer as a mask with the layer defining the edges of the portions of the silicon surface to be etched. More specifically, it prevents an SiO₂ from defining such boundaries in order to prevent undercutting of the SiO₂ layer (*Hawkins*, Column 5, lines 58-66).

Dependent Claims 7-10

Claims 7-10 are not anticipated by *Hawkins* at least because of their dependence on claim 6. The Office Action admits the inadequacy of *Hawkins*, at least in regard to claims 7, 9 and 10, but attempts to overcome such inadequacies by, for claim 7, asserting obviousness in light of the knowledge of one of ordinary skill in the art, combining *Hawkins* with *Kawamura* for claim 9, and combining *Hawkins* with *Hess* for claim 10.

In regard to claim 7, the Office Action asserts that it would have been obvious to one of ordinary skill in the art to use a conventional method of forming a gate electrode by growing or depositing an oxide layer on a semiconductor in fabricating a transistor. Whether true or not, this assertion alone is insufficient to overcome the inadequacy of *Hawkins* in regard to claim 7 as not

only must an oxide layer be used to form a transistor, but the same oxide layer must (a) be covered by a passivation layer, and (b) act as a mask for etching the underlying silicon substrate. These recitations are not taught, suggested, or motivated by *Hawkins* or any knowledge of a person of ordinary skill in the art at the time of the claimed invention. Moreover, the inadequacies of *Hawkins* in regard to claim 6 are not satisfied by the modification suggested by the Office Action.

In regard to claim 9, the Office Action asserts that it would have been obvious to modify *Hawkins* by employing *Kawamura's* method of adding and removing a portion of a layer of phosphosilicate glass (PSG) "for the purpose of protecting the layer from being vulnerable to certain inks and the etchant used to form a trench...." However, the reason provided only addresses why one would remove a portion of a PSG layer, not why one would include such a layer with *Hawkins*. As there is no teaching, suggestion, or motivation for using a PSG layer with *Hawkins*, the rejection of claim 9 should be withdrawn. Moreover, the inadequacies of *Hawkins* in regard to claim 6 are not satisfied by the modification suggested by the Office Action so even if the proposed combination was taught, suggested or motivated by the cited art, the combination would still be inadequate to render claim 9 unpatentable.

In regard to claim 10, the Office Action fails, in a manner similar to claim 9, to provide a reason for adding heat transducer to the structure of *Hawkins*, and thus does not render claim 10 unpatentable. Moreover, the inadequacies of *Hawkins* in regard to claim 6 are not satisfied by the modification suggested by the Office Action so even if the proposed combination was taught, suggested or motivated by the cited art, the combination would still be inadequate to render claim 10 unpatentable.

Independent Claim 11

The rejection of claim 11 should be withdrawn as *Kawamura* fails to teach or suggest all the recitations of claim 11 and therefore does not anticipate claim 11.

Claim 11 recites: "A method of fabricating multiple layers of a thermal inkjet printhead that includes a substrate and a trench for moving ink across the substrate, as well as drop generator components for ejecting drops of ink from the substrate, comprising the steps of:

providing on the substrate a layer to serve both as a drop generator component and as a mask to define the trenches for etching; and then etching the substrate to form the trenches in the substrate." (Emphasis added). As has already been at least partially discussed, the trenches of *Kawamura* are formed on a side of the substrate opposite the ink moving trenches, and the mask for the trenches is not also used as a drop generator component. Simply using the same materials is insufficient, despite the assertion by the Office Action to the contrary, to satisfy the claim as the claim is directed to the manner in which at least one layer of the materials is used (i.e. "as a mask to define the trenches" and "as a drop generator component") and where the trench mask is opposite the side on which any components are likely to be formed (i.e. the side of thin film layers 22). As such, *Kawamura* does not anticipate claim 11.

Dependent Claims 12-14

Claims 12-14 are not anticipated by *Kawamura* at least because of their dependence on claim 11. The Office Action admits the inadequacy of *Kawamura*, at least in regard to claims 12 and 13, but attempts to overcome such inadequacies by, for claim 12, asserting obviousness in light of the knowledge of one of ordinary skill in the art, and combining *Hawkins* with *Kawamura* for claim 13. However, the combinations proposed by the Office action do not overcome the inadequacies of *Kawamura* in regard to claims 12 and 13.

In regard to claim 12, the Office Action fails to properly support the rejection for the same reasons as previously provided in regard to claim 7, i.e. not only must an oxide layer be used to form a transistor, but the same oxide layer must act as a mask. This inadequacy is particularly true in regard to *Kawamura* due to the positioning of the thin film layers and trenches on opposite sides of the substrate. Moreover, the inadequacies of *Kawamura* in regard to claim 11 are not satisfied by the modification suggested by the Office Action.

New Matter Assertion and Rejections Under 35 U.S.C. §112.

Independent Claim 23

The Office Action asserts that claims 23-26 add new matter, fail to satisfy the written description requirement, and are indefinite. Applicant respectfully suggests that particular attention be paid to figure 6 of the application as filed and to paragraphs [0034] and [0035]

before the new matter assertion and §112 rejections are maintained. However, although not required, as the prior form the claims was fully supported by the application as filed, Applicant has chosen to amend claim 23 to recite "depositing a passivation material on a first portion of the substrate surface and subsequently removing a portion of the deposited passivation material from a second portion of the substrate surface within the first portion, such that the second portion is free of passivation material". Thus, even if the assertions and rejections of the Office Action were valid in regard to the prior form of claims 23-26, such assertion and rejections are moot in light of the amendments contained herein.



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Conclusion

In view of the amendments and remarks, it is respectfully submitted that all the pending claims are in condition for allowance, and such action is earnestly solicited.

If the Examiner believes an interview would be helpful to advance this case, he is invited to contact the undersigned attorney.

Respectfully submitted,

SNELL & WILMER L.L.P.

I hereby certify that this document and fee is being deposited on June 8, 2004 with the U.S. Postal Service as first class mail under 37 C.F.R. § 1.8 and is addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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